

LASER AIMS TO SHOOT DATA THROUGH THE AIR

Fiber-free laser communications systems allow companies to transmit data through the air, connecting multiple building sites at an affordable cost.



■ AstroTerra's newest product, the TerraLink 1000™ (pictured above), provides low-cost, fast data rate laser communications for distances under a mile.



■ A TerraLink 8-155™ (pictured above) provides high-speed wireless connectivity between the Las Vegas Convention Center and the Hilton Hotel.

The city of Santa Barbara, California, is ever vigilant to enforce strict regulations against altering historic buildings and city streets. That is what STAR Telecom, a provider of wholesale international long-distance telephone services, found out soon after the company decided to expand its corporate local area network. The city's aesthetic ordinances banned any effort to trench fiber across the street or to install large microwave antennas on buildings. Thus, STAR Telecom could not establish a network connection to its other downtown building.

Thanks to new laser communications (lasercom) equipment developed by AstroTerra Corporation (San Diego, CA), STAR Telecom established a low-cost, high-bandwidth connection between its two buildings—without disturbing the historic land and buildings. AstroTerra's cutting-edge lasercom technology, called TerraLink™, is ideal for meeting the ever-increasing demand for greater bandwidth among multiple buildings at an affordable cost. For corporate network managers, this innovation provides a new alternative to fiber, microwave, and radio frequency (RF) technologies, which in some cases can be too expensive, too complex, and too low in bandwidth.

Through the air. AstroTerra's lasercom systems use infrared (IR) laser light to transmit the 1s and 0s that make up a digital signal. This process is similar to the one that takes place inside a fiber-optic cable, but for laser communications, the light travels through the air. AstroTerra spun off its lasercom technology from a BMDO-funded project to develop a satellite lasercom transceiver, which is scheduled to be lofted into low-Earth orbit in early 1999 as part of BMDO's Space Technology Research Vehicle (STRV)-2 experiment. In STRV-2, the transceiver will be used to demonstrate communication between the satellite and the ground at 1 gigabit per second as well as to downlink IR sensor data.

TerraLink systems provide new alternatives to installing fiber-optic cable between sites. "For high-bandwidth applications such as telemedicine or video-conferencing, TerraLinks are more attractive when it is too costly or impossible to install fiber-optic cable," says Dr. Eric Korevaar, AstroTerra's founder and president. "For situations that require temporary network connectivity, such as exhibitions, conventions, sporting events, or emergency situations, high-bandwidth links can be easily and quickly provided using portable TerraLink systems. With

private corporate networks, purchasing a TerraLink can provide a very high bandwidth link between sites without the recurring costs of leased lines.”

TerraLink products offer bandwidth, operation, and security advantages over microwave and RF technologies. TerraLink systems transmit data faster than any currently available microwave or RF system. They do not require a frequency license from the Federal Government or right-of-way from the municipality involved. In addition, their IR beams are invisible and confined to a narrow path, thus making them difficult to intercept.

Several TerraLink products are commercially available. The basic TerraLink 8-155™ can transmit and receive data at up to 155 megabits per second (Mbps), with a clear weather range of up to 5 miles. The faster TerraLink 8-622™ allows a data rate of 622 Mbps—which exceeds the current bandwidth capabilities of microwave—at clear-weather distances of up to 3 miles. The TerraLink 4-155™ and TerraLink 1000™ offer the same connectivity as the TerraLink 8-155 but cost less because they are designed for distances less than a mile.

Purchases and evaluations. A number of municipal and commercial organizations have purchased or are currently evaluating TerraLink products. The San Diego County Water Authority installed a TerraLink system to establish a high-speed data link between two office buildings in downtown San Diego, California. The Authority says it saved a substantial amount of money because it avoided the costs of trenching cables across the street and leasing lines between the two buildings. Kaiser Permanente’s Technology Evaluation and Support Center is currently evaluating TerraLink for use in its health care facilities throughout California.

In addition, AstroTerra is investigating several military applications for its TerraLink technology. The company is involved in tests for ship-to-ship and ship-to-shore communications for the U.S. Navy, site-to-site communications for the U.S. Army, and unmanned aerial vehicle communications for the U.S. Air Force.

Another potential market, space communications, may be pursued if BMDO’s STRV-2 demonstration of AstroTerra’s lasercom technology is successful. To attract prospective customers, AstroTerra is building a lasercom evaluation model with a data rate greater than 1 gigabit per second for satellite-to-satellite and satellite-to-ground links.

■ For more information, contact Eric Korevaar via telephone at (619) 792-8501 or via E-mail at korevaar@astroterra.com. You can also visit AstroTerra’s Web site at <http://www.astroterra.com>.



What Does It Mean to You?

Lasercom systems will establish secure, high-bandwidth connections between two or more nearby buildings, allowing workers to communicate more efficiently with each other.



What Does It Mean to Our Nation?

Lasercom systems will help municipalities preserve historic streets and buildings while allowing companies to expand communications networks.

Tech Trivia

In which of the following novel applications have infrared lasers not been used?

- A. Security
- B. Eye surgery
- C. Aircraft inspection
- D. Three-dimensional imaging

For the answer, see page 72.